WO 2004/054805
PCT/DE2003/004098

Claims

1. A method for controlling the temperature of a component (01) of a machine by means of a regulating device (21), characterized in that a respective measured value (Θ_1, Θ_2, Θ_3, Θ_4. Θ_5) of a temperature is determined at two measuring points (M1, M2, M3, M4, M5), which are arranged on a measuring section (02) and spaced apart from each other, and respectively one of the measured values (Θ_1, Θ_2, Θ_3, Θ_4, Θ_5) is provided to two regulating circuits of the regulating device (21), which are connected with each other in a cascade-like manner.

2. The method in accordance with claim 1, characterized in that the temperature control is provided by means of a fluid, whose temperature is set at a feed-in point (16) by means of the regulating device (21) and which is conducted to the component (01) along an inflow path (12) arranged downstream of the feed-in point (16).

3. The method in accordance with claim 1, characterized in that a first one of the measured values (Θ_1) is determined near the feed-in point, and a second one of the measured values (Θ_2, Θ_3, Θ_4) is determined near the component.

4. A method for controlling the temperature of a component (01) of a machine by means of a fluid, whose temperature is set at a feed-in point (16) by means of the regulating device (21) and which is conducted to the component (01) along an inflow path (12) arranged downstream

of the feed-in point (16), characterized in that on the path from the feed-in point (16) to and including the component (01) a respective measured value (Θ_1, Θ_2, Θ_3) of a temperature is determined at at least two measuring points (M1, M2, M3) of the measuring section (02) and is supplied to the common regulating device (21), and that one of the measured values (Θ_1) is determined near the feed-in point, and a second one of the measured values (Θ_2, Θ_3) is determined near the component.

5. The method in accordance with claim 3 or 4, characterized in that the fluid temperature as the first measured value (Θ_1) is measured downstream of the feed-in point (16), but upstream of a drive mechanism (11) conveying the fluid.

6. The method in accordance with claim 3 or 4, characterized in that the second measured value (Θ_2) as the fluid temperature is measured at an inflow path of the fluid to the component (01), whose measuring point (M2) in respect to the running time of the fluid for cooling is spaced farther than half the distance from the feed-in point (16) to the destination (22).

7. The method in accordance with claim 4, characterized in that respectively one of the measured values (Θ_1, Θ_2, Θ_3) is supplied to two regulating circuits of the regulating device (21), which are connected with each other in a cascade-like manner.

8. The method in accordance with claim 1 or 7,

characterized in that an inner one of the at least two regulating circuits acts on an actuating member (07) with an actuating command (Delta), and that an output value ($d\Theta_1$) of the outer one of the at least two regulating circuits is used for forming a corrected command variable ($\Theta_{1,soll,k}$) for the inner regulating circuit.

9. The method in accordance with claim 8, characterized in that a theoretical command variable ($\Theta'_{1,soll}$) is used for forming the corrected command variable ($\Theta_{1,soll,k}$) for at least the inner regulating circuit, which is formed in a pre-regulating member in respect to the heat flow V_{WF} and takes expected heat or cooling losses in the measuring section (02) into consideration.

10. The method in accordance with claim 8, characterized in that pre-regulation regarding the running time and/or the time constant (V_{LZ}) takes place for forming the corrected command variable ($\Theta_{1,soll,k}$) for at least the outer regulating circuit.

11. The method in accordance with claim 8, characterized in that pre-regulation regarding a specific excess amplitude by means of a derivative member (V_{VH}) takes place for forming the corrected command variable ($\Theta_{1,soll,k}$) for at least the two regulating circuits.

12. The method in accordance with claim 8, characterized in that pre-regulation regarding the number of revolutions of the machine (V_{DZ}) takes place for forming the corrected command variable ($\Theta_{1,soll,k}$) for at least the inner

regulating circuit.

13. The method in accordance with claim 8, characterized in that pre-regulation regarding actuating member characteristics takes place by means of a rise limiter (V_{AB}) for forming the corrected command variable ($\Theta_{1,soll,k}$) for at least the inner regulating circuit.

14. The method in accordance with claim 1 or 7, characterized in that the temperature is determined at a first, a second and a third measuring point (M1, M2, M3, M4) and is supplied to respectively one of three regulating circuits of the regulating device (21) which are connected with each other in a cascade-like manner.

15. The method in accordance with claim 3, 4 or 14, characterized in that the second measured value (Θ_2) is determined as the temperature of the fluid prior to entering the component (02).

16. The method in accordance with claim 15, characterized in that the temperature in the inflow path (12) of the fluid is measured downstream of a drive mechanism (11) conveying the fluid.

17. The method in accordance with claim 3 and 14, characterized in that the third measured value (Θ_3) is determined as the component temperature.

18. The method in accordance with claim 3 and 14, characterized in that the third measured value (Θ_3) is

determined as the temperature of the fluid directly following its exit from the component (01).

19. The method in accordance with claim 8, characterized in that the fluid circulates at least partially in a first circuit, and the temperature control takes place by means of metering in fluid from a second cycle via the actuating member (07) embodied as a valve (07).

20. The method in accordance with claim 8, characterized in that the fluid circulates in a circuit and the temperature control is performed by means of a heating or cooling unit via the actuating member (07) embodied as an output control (07).

21. A regulating device for controlling the temperature of a component (01) of a machine by means of a regulating device (21), characterized in that the regulating device (21) has at least two regulating circuits, which are connected with each other in a cascade-like manner and which are respectively provided with a measured value (Θ_1, Θ_2, Θ_3, Θ_4. Θ_5) from two measuring points (M1, M2, M3, M4, M5), which are arranged on a measuring section (02) and spaced apart from each other.

22. The regulating device in accordance with claim 21, characterized in that an output signal from the inner one of the at least two regulating circuits is fed as an actuating command (Delta) to an actuating member (07), and an output value ($d\Theta_1$) of the outer one of the at least two regulating circuits is fed to an input of the inner regulating circuit.

23. The regulating device in accordance with claim 22, characterized in that a pre-regulating member ($V_{WF,i}$) is provided at least for the inner regulating circuit, by means of which a theoretical command variable ($\Theta'_{1,soll}$) can be generated in the course of forming the command variable, which takes expected heat or cooling losses in the measuring section (02) into consideration.

24. The regulating device in accordance with claim 22, characterized in that a pre-regulating member (V_{LZ}) is provided at least for the outer regulating circuit, by means of which a running time of the fluid to be expected and/or a replacement time constant (V_{LZ}) can be taken into consideration in the course of forming the command variable.

25. The regulating device in accordance with claim 22, characterized in that respectively one derivative member ($V_{VH,i}$) is provided for at least two regulating circuits, by means of which a specific excess amplitude can be generated in the course of forming the command variable.

26. The regulating device in accordance with claim 22, characterized in that a pre-regulating member (V_{DZ}) is provided at least for the inner regulating circuit, by means of which the number of revolutions of the machine can be taken into consideration in the course of forming the command variable.

27. The regulating device in accordance with claim 22, characterized in that a pre-regulating member (V_{AB}) in the manner of a rise limiter is provided for at least the inner

regulating circuit, by means of which actuating member characteristics can be taken into consideration in the course of forming the command variable.

28. The regulating device in accordance with claim 21, characterized in that the regulating device (21) has three regulating circuits, which are connected with each other in a cascade-like manner, to each of which a measured value (Θ_1, Θ_2, Θ_3, Θ_4. Θ_5) from three measuring points (M1, M2, M3, M4, M5), which are arranged on a measuring section (02) and spaced apart from each other, is supplied.

29. The regulating device in accordance with claim 21 or 28, characterized in that the regulating circuits have regulators (R1, R2, R3), which are designed as PI regulators.

30. The regulating device in accordance with claim 21 or 28, characterized in that at least one of the regulating circuits has a regulator (R1, R2, R3), which is designed as a regulator based on the running time.

31. A device for the temperature control of a component (01) of a machine by means of a fluid, whose temperature can be changed at a feed-in point (16) and which can be conducted to the component (01) along an inflow path (12) arranged downstream of the feed-in point (16), characterized in that on the path from the feed-in point (16) to and including the component (01) at least two measuring points (M1, M2, M3, M4, M5) are arranged, and that one of the measuring points (M1) is arranged near the feed-in point, and a second one of the measuring points (M2, M3) near the

component.

32. The device in accordance with claim 31, characterized in that the first measuring point (M1) is arranged downstream of the feed-in point (16), but upstream of a drive mechanism (11) conveying the fluid.

33. The device in accordance with claim 31, characterized in that for cooling, the second measuring point (M2) is arranged between a drive mechanism (11) conveying the fluid and a destination (22).

34. The device in accordance with claim 33, characterized in that the second measuring point (M2) is arranged in the inflow path (12) upstream of the entry of the fluid into the component (01).

35. The device in accordance with claim 31, characterized in that measured values (Θ_1, Θ_2, Θ_3) from the two measuring points (M1, M2) are provided to a common regulating device (21).

36. The device in accordance with claim 35, characterized in that the regulating device (21) is embodied in accordance with one or several of claims 18 to 25.

37. The device in accordance with claim 31, characterized in that the first measuring point (M1) is arranged upstream of the feed-in point (16) maximally 2 seconds away in respect to a running time of the fluid.

38. The device in accordance with claim 31, characterized in that the second measuring point (M2) is arranged farther distant than half the distance between the feed-in point (16) and the destination (22) in respect to a running time of the fluid.

39. The device in accordance with claim 31, characterized in that a third measuring point (M3) is provided for determining the component temperature, whose measured value is supplied to a regulating device in accordance with claim 25.

40. The device in accordance with claim 31, characterized in that the first measuring point (M1) is arranged between the feed-in point (16) and a pump (17).

41. The device in accordance with claim 31, characterized in that a swirling chamber (17) is arranged between the feed-in point (16) and the first measuring point (M1).

42. The method for controlling the temperature in accordance with claim 1 or 4, the regulating device in accordance with claim 21 or the device in accordance with claim 31, characterized in that the component (01) is embodied as a roller (01) or cylinder (01) of a printing press.

43. The method for controlling the temperature in accordance with claim 1 or 4, the regulating device in accordance with claim 21 or the device in accordance with

claim 31, characterized in that the component (01) is embodied as a roller (01) or cylinder (01) of a dampening agent-free offset printing group.